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ADDRESS TO THE GRADUATING
CLASS OF THE MASSACHUSETTS
INSTITUTE OF TECHNOLOGY

By ARTHUR A. NOYES, Acting President



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ADDRESS TO THE GRADUATING CLASS OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DELIVERED JUNE 8, 1908

BY ARTHUR A. NOYES, ACTING PRESIDENT*

Friends of the Institute and of members of the Graduating Class: It is now to be my privilege, as the representative of the Corporation, to confer in your presence the degrees of the Institute upon the various candidates whom the Faculty has recommended as worthy of that recognition.

This Institute awards the four degrees of Doctor of Philosophy, Doctor of Engineering, Master of Science, and Bachelor of Science. The degree of Doctor of Philosophy is this year to be conferred upon 3 candidates, that of Master of Science upon 12, and that of Bachelor of Science upon 229.

The degrees of Doctor of Philosophy and of Engineering are granted for the completion of two or three years of graduate work devoted to advanced studies in some branch of science or engineering and to an extensive original research in one of them. These degrees signify a highly developed power of pursuing scientific investigations independently and effectively.

The degree of Master of Science is awarded for the continuation of such professional studies as are included in the regular four-year courses through a fifth year. It represents a larger professional knowledge and a more extensive

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training in the solution of scientific or engineering problems than can be secured in the shorter period of study.

The characteristics of the four-year courses leading to the degree of Bachelor of Science, which form the main part of the work of this Institute, I should like to describe to you somewhat more fully. These courses are not such as are given in technical schools of the narrower type, where the aim is to train men for some specific industry and where much time is devoted to the imparting of technical knowledge and skill. From its foundation the Institute has stood for the principle of higher education, now put in practice in all the better American universities, that the student be given a combination of a liberal education, such as every well-educated man should receive, with such professional training as will fit him for some high form of service to the community. The Institute aims, however, to accomplish this result by methods different from those followed by the universities.

In the first place, while the Institute requires that a fair proportion of the student's work consist of the so-called humanistic studies,—of studies in English composition and literature, modern language, history, political science, and economics,—yet its Courses are arranged so that these studies are pursued simultaneously with the professional work throughout nearly the whole period of study. On the university plan, however, the so-called liberal studies are completed in the college before the student begins his professional work, which is then carried on in the Graduate School. The Institute plan has the advantage that the student acquires from the start the earnestness and interest which the direct preparation for his life-work naturally incites in the mind of a young man, who cannot thus early so well appreciate the important but less tangible results of

general education; while, on the other hand, the general studies are continued and emphasized in their relation to the professional work throughout the whole course.

In the second place, the Institute, far more than the academic college, lays stress upon scientific studies as an essential part of a liberal training. It has no sympathy with the idea that a man can be considered broadly educated, whatever his knowledge of the classics or history or literature, who is entirely ignorant of the chemical composition and properties of the materials he daily deals with; who knows nothing of the elementary principles of mechanics, heat, light, and electricity, which are constantly involved in the daily experiences of modern life and in its important industrial operations; who looks nightly into the heavens, or observes the forms of land or water, sees the seasons come and go, watches the tides rise and fall, without knowing or caring to know the explanation of these phenomena. The Institute holds that a training in physical and natural science, though not the only essential part of education, is yet the chief factor in imparting a true culture and an adaptation to the affairs of life.

Thirdly, the Institute considers the acquirement of knowledge of any kind whatever, whether literary or scientific or professional, far less important than the training of the mind in scientific thinking and scientific method. It aims not only to impart a knowledge of principles, but also to develop the faculties so that its graduates may be fitted to cope with and solve the great engineering and scientific problems of the day. To this end much of its instruction consists in this very thing,—the solving of problems in the class-room, laboratory, and designing-rooms. The theses, some of which have been presented in abstract to you to-day, are only larger examples of this side of our

work, which in the form of minor problems extends throughout the whole four years. With this end in view, also, we determine the standing of a student very largely by his term work rather than by his success in a final examination, which too often depends on his ability to get up the subject by cramming.

I might describe other characteristics of our Institute courses; but I believe these statements will serve to show you the general character of the training which has been received by the candidates upon whom the degree is to-day to be conferred. I do not mean to imply that we have accomplished all these results in the case of these young men. We know that our teaching is imperfect in many ways and that our methods are capable of much improvement. It is also true that at best a four-year period is too short to realize all the results which I have mentioned. Yet what I have said will show you the directions in which we are working and the ideals toward which we are constantly striving; and it will enable you to appreciate better the kind of work in which these young men have been engaged. Let me now turn your attention to the candidates themselves.

Members of the Graduating Class: I desire first of all to extend to you the hearty congratulations of the Corporation and Faculty on the accomplishment of the result for which you have successfully striven. You are to be congratulated not so much because the diploma which I shall soon have the pleasure of presenting to each of you certifies to the completion of a prescribed course of study, and to the acquirement of much liberal and professional knowledge, as because it implies the possession and development of certain qualities of mind and character which are fundamentally essential to the highest success in life,—a willingness to subordinate the pursuit of pleasure to the fulfil-

ment of duties, a determination to accomplish in spite of difficulties whatever has been deliberately undertaken, an integrity of mind which will not contentedly, accept as final, imperfect or inexact results. The award to you of the degree implies, too, that you have formed sound habits of work that cannot fail to be of prime importance to you in your subsequent careers; for while the Institute curriculum is not so exacting as to preclude a reasonable participation in the affairs of student life, yet it demands that time and effort be economically expended. There has been here no opportunity for that undue predominance of the physical and social activities over the intellectual which characterizes the student life of many colleges. As a former president said from this platform to a former graduating class, you are not now required to do "what is implied in that ominous phrase 'turning over a new leaf.' It is not now necessary for you to close a collegiate period of idleness, or frivolity, or dissipation with good resolutions of amendment and reformation for the future and with a determination, now taken for the first time, to pursue your work with seriousness of purpose and with the aim of high accomplishment." You have taken these resolutions long ago, and have already developed the qualities necessary for their fulfilment: else you would not be here to-day. It is only necessary for you to continue in the way that you have thus far pursued.

It is true, you must continue to develop your powers and faculties. You must not assume that your education has been completed. You must regard it as only well begun. You must still employ every opportunity for self-improvement through reading, study, and participation in scientific societies. You must broaden and deepen your knowledge both on the cultural and professional sides,—on the former

side, so that you may strengthen your interests in the affairs of other men and broaden your view-point and sense of perspective; on the latter side, so that you may be more effective engineers, architects, or chemists. When you find in your professional work that you need more knowledge of an allied branch of engineering or of some related science, you must make the effort needed to master it. You have also got to acquire a vast amount of technical knowledge and practical experience. Realize this, so that you may not subject yourselves to the criticism sometimes made by employers, that technological graduates think they “know it all.”

It is, then, important for you to continue your education,—your own self-improvement. But with your graduation there comes upon you an entirely new obligation. Thus far you have been only developing your own powers. You are now called upon to use those powers for the service of your fellow-men. Your scientific training imposes on you a special obligation, because it opens to you special opportunities. You can render important kinds of service which other men cannot render. You are to play a part of peculiar responsibility in our great industrial and commercial system. You are not to deal directly with its financial and mercantile aspects, but you are charged with its improvement and further development through the introduction of scientific methods and principles.

Some of you, the civil and sanitary engineers and architects among you, are to create *new structures*,—new highways, bridges, subways, and tunnels for increasing the facilities of transportation,—new buildings of solid construction and artistic beauty,—new reservoirs, aqueducts, and sewers for the better sanitation of cities and the development of water power,—new vessels for coastwise and

oceanic commerce. Others of you, the mechanical and electrical engineers,—are to provide for *new power*, either mechanical or electrical, devising and constructing machines for this purpose, for the saving of labor in the production of manufactured articles, for electric lighting, or for use in telephony. Still others of you, the chemists, electro-chemists, chemical engineers, mining engineers, and metallurgists, are to deal directly with the production of *new materials* or of old materials by *new processes*. You will all be expected to do *new* things; and you must therefore not be contented merely to carry on old things in the old way. One of your most important opportunities in this direction will be that of avoiding economic waste,—waste of power through imperfect machines, waste of materials through unscientific processes, waste of time and effort through inadequate structures and transportation facilities. So you should be constantly on the alert to discover and to remedy such defects.

Your training thus opens to you an unusual opportunity for service to the community. And *service* is the keynote of the spirit of this twentieth century. In politics the old idea, "To the victor belong the spoils," has given place to the principle that "public office is a public trust." In business it can no longer be said that "It is the day of the chattel, Web to weave and corn to grind, That things are in the saddle, And ride mankind." A higher code of business ethics prevails: destructive competition is being replaced by co-operative effort; corporations are endeavoring to render better public service and are giving their employees a fairer share of the profits; accumulated wealth is more and more being used for philanthropic ends. In education it is no longer thought sufficient to impart the social, literary, and artistic accomplishments of the gentleman, but every

youth must be fitted for some form of service. In scientific research the dilettant investigator who pursues his studies only for his own pleasure rather than with the definite purpose of contributing to the advancement of knowledge is no longer regarded with approbation. In religious teaching what has been called, "other-worldliness" is disappearing,—the hope of future reward or the fear of future punishment is no longer emphasized; and in the science of ethics the greatest happiness of the greatest number is no longer recognized as the fundamental postulate. In these two fields of thought, religious and ethical, the advance of science and especially of the knowledge of evolution has brought us to a clearer appreciation of our relation to the universe and to a higher conception of our obligations. It is no longer for our own ends, whether in this world or another, that we are to work. We realize that we are at an intermediate stage in the process of development. We know that "man will grow from more to more,"—that our present type is but the "herald of a higher race." With the poet "we doubt not through the ages one increasing purpose runs"; and we strive to further the accomplishment of that purpose, which, so far as we can understand it in relation to ourselves, has for its end the fuller development of manhood and of the human faculties.

The question for each of you is therefore, How can you render the greatest service? If you follow this as your guiding principle, you need have no fear of failure in your life-work, even if it be judged from such other standpoints as the attainment of happiness, or of public recognition, or of personal influence.

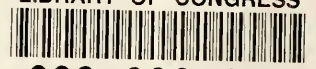
With these few words of congratulation and encouragement for the future, I enter upon the pleasant task of distributing to you the diplomas of your graduation.

(The degrees were then conferred.)

It gives me now much pleasure to extend to you as Doctors, Masters, or Bachelors of Science the greetings of the Corporation and Faculty and of your friends, and to assure you of the interest of your teachers in your future welfare and of their best wishes for success in the work you are soon to undertake. Of you we ask, in return, that you continue to give to the Institute your attention and support. We wish you fully to realize that upon you as alumni depends in large measure the continued success and development of this Institute, and that we count upon each of you individually to do your part in maintaining an active interest in its welfare.

There will always be a cordial welcome for you within these halls; and, in now saying a final farewell to you as a class, it is my hope that it may be only a temporary one to you as individuals.

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